

RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By W. J. Moxom

The outstanding flood of December 1935 was the record breaking overflow of Buffalo and White Oak Bayous at Houston, Tex., on the 8th and 9th. This destructive flood was caused by excessive rainfall over Harris County, Tex., during a 42-hour period on the 6th, 7th, and 8th, with amounts ranging from 5½ inches at Houston to approximately 20 inches near the center of the 406 square mile watershed. The following report made by the Weather Bureau office at Houston, Tex., is of interest:

Torrential rainfall over Harris County on December 6, 7, and 8, caused phenomenal rises in Buffalo and White Oak Bayous. These streams have their courses almost entirely in Harris County and their confluence is near the center of the wholesale district of the city of Houston. The Buffalo Bayou flows through the center of the city and empties into Galveston Bay. The lower course from the eastern part of the city to Galveston Bay has been deepened to form the Houston Ship Channel. There has been the usual encroachment on the channel through the city and this operated to retard the flow of flood waters and caused exceptionally destructive flooding in the business district as well as in some residential districts. More than 100 city residential blocks were flooded. Homes had to be abandoned and much hardship followed. Fortunately, mild weather prevailed. Eight persons were drowned. The property loss is conservatively estimated at \$2,500,000, consisting of damage to roads, bridges, buildings, and contents. Several buildings in the wholesale district were completely wrecked by the undermining of their foundations. Stocks of goods in several warehouses were ruined.

The greatest 24-hour rainfall in Houston was 5.38 inches on the 7th and 8th, but the catch in a standard rain gage exposed at Satsuma, a pumping station of the Humble Oil Co., in the northwestern part of Harris County, was 16.49 inches, and catches of 21 inches were reported, but these were measured in improvised gages and cannot be accepted as entirely reliable.

Levels run by the city engineer show a stage of 40.3 feet above mean tide level immediately below the confluence of the Buffalo and White Oak Bayous, as compared with 34.3 feet on May 31, 1929, and 34.3 feet in 1879 (date unknown). The crest passed in the early morning of December 9.

Minor floods with slight damage occurred in the Little and Sulphur Rivers, tributaries of the Red River; in East and Elm Forks of the Trinity River in Texas; and in the Petit Jean and Ouachita Rivers in Arkansas. Rapid rises, which closely approached but did not reach flood stages, occurred in the White River below Newport, Ark., and in the Arkansas River below Ozark, Ark. Ample warnings were issued, and only comparatively small losses occurred.

Numerous small ice gorges in the Missouri River above Kansas City, combined with the freezing of tributaries of the Missouri, checked the flow of water to such extent that an all time record for low stages at Kansas City,

Mo., was established on December 27, 1935, when the river gage reading was -0.9 foot.

Table of flood stages in December 1935

[All dates in December]

River and station	Flood stage	Above flood stages--dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM					
White Basin					
White:	Feet			Feet	
Newport, Ark.....	26	-----	-----	18. 0	9
Georgetown, Ark.....	21	-----	-----	19. 5	10
Clarendon, Ark.....	26	-----	-----	23. 0	18
Arkansas Basin					
Petit Jean: Danville, Ark.....	20	7	10	23. 30	9
Arkansas:					
Ozark, Ark.....	22	-----	-----	15. 6	8
Dardanelle, Ark.....	22	-----	-----	18. 48	8
Morrilton, Ark.....	20	-----	-----	17. 20	8
Little Rock, Ark.....	23	-----	-----	18. 0	9
Pine Bluff, Ark.....	25	-----	-----	20. 9	9
Red Basin					
Ouachita:					
Arkadelphia, Ark.....	17	7	7	17. 72	7
Camden, Ark.....	26	-----	-----	25. 26	13
Little: Whitecliffs, Ark.....	25	10	12	25. 7	11
Sulphur:					
Ringo Crossing, Tex.....	20	7	10	23. 9	7
Naples, Tex.....	22	12	16	24. 3	13
WEST GULF OF MEXICO DRAINAGE					
East Fork (Trinity): Rockwall, Tex.....	13	9	9	16. 15	9
Elm Fork: Carrollton, Tex.....	6	7	8	7. 45	7
Trinity: Liberty, Tex.....	25	9	19	26. 4	13

FLOOD LOSSES DURING 1935

The estimated flood losses in the United States during 1935 were the greatest since 1927, and amounted to \$127,144,841. A comparative table of estimated flood losses for the years 1927-35, inclusive, follows:

Year	Damage	Lives lost	Year	Damage	Lives lost
1927	\$316,717,631	391	1932	\$12,796,645	56
1928	44,167,214	23	1933	35,322,410	23
1929	54,699,937	56	1934	10,351,291	87
1930	13,857,475	12	1935	127,144,841	244
1931	2,867,725	6			

The following tables are statements of estimated flood losses, and savings effected by Weather Bureau flood warnings in the year 1935.

Statement of estimated flood losses during the year 1935

ST. LAWRENCE DRAINAGE

SAGINAW RIVER IN MICHIGAN

Tangible property totally or partially destroyed.....	\$175, 000
Suspension of business, including wages of employees ..	10, 000

SMALL STREAMS AROUND ITHACA, N. Y.

Tangible property totally or partially destroyed.....	13, 000, 000
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Total.....	13, 185, 000
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ATLANTIC SLOPE DRAINAGE

CONNECTICUT RIVER IN NEW ENGLAND

Tangible property totally or partially destroyed.....	3, 368
Suspension of business, including wages of employees ..	9, 400

MOHAWK RIVER IN NEW YORK

Tangible property totally or partially destroyed.....	188, 000
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SCHUYLKILL RIVER IN PENNSYLVANIA

Tangible property totally or partially destroyed.....	200, 000
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SMALL STREAMS IN DELAWARE AND EASTERN
MARYLAND

Tangible property totally or partially destroyed.....	950, 000
Matured crops.....	1, 650, 000

CHENANGO RIVER IN NEW YORK

Tangible property totally or partially destroyed.....	126, 750
Prospective crops.....	850
Matured crops.....	100
Livestock and other movable property.....	11, 900
Suspension of business, including wages of employees ..	10, 390

SUSQUEHANNA RIVER IN NEW YORK

Tangible property totally or partially destroyed.....	7, 001, 700
Matured crops.....	5, 000, 500
Suspension of business, including wages of employees ..	700

SUSQUEHANNA RIVER IN PENNSYLVANIA

Tangible property totally or partially destroyed.....	1, 000, 150
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JAMES RIVER IN VIRGINIA

Tangible property totally or partially destroyed.....	33, 250
Prospective crops.....	12, 600
Matured crops.....	100, 000
Livestock and other movable property.....	2, 150
Suspension of business, including wages of employees ..	12, 725

ROANOKE RIVER IN NORTH CAROLINA

Prospective crops.....	12, 000
Matured crops.....	5, 600
Suspension of business, including wages of employees ..	27, 000

TAR RIVER IN NORTH CAROLINA

Suspension of business, including wages of employees ..	2, 000
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CAPE FEAR RIVER IN NORTH CAROLINA

Tangible property totally or partially destroyed.....	1, 000
Prospective crops.....	2, 000
Suspension of business including wages of employees...	12, 000

SALUDA RIVER IN SOUTH CAROLINA

Prospective crops.....	1, 500
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SAVANNAH RIVER IN GEORGIA AND SOUTH
CAROLINA

Tangible property totally or partially destroyed.....	5, 000
Livestock and other movable property.....	100
Suspension of business, including wages of employees ..	9, 250

Total.....	16, 391, 383
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EAST GULF OF MEXICO DRAINAGE

TALLAPOOSA RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	\$1, 000
Suspension of business, including wages of employees ..	1, 000

ALABAMA RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	50
Suspension of business, including wages of employees ..	125

TOMBIGBEE RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	2, 250
Matured crops.....	18, 100
Livestock and other movable property.....	2, 300
Suspension of business, including wages of employees ..	12, 500

PASCAGOULA RIVER IN MISSISSIPPI

Tangible property totally or partially destroyed.....	32, 500
Prospective crops.....	100
Livestock and other movable property.....	2, 400
Suspension of business, including wages of employees ..	200

PEARL RIVER IN MISSISSIPPI

Tangible property totally or partially destroyed.....	352, 550
Prospective crops.....	3, 800
Matured crops.....	48, 000
Livestock and other movable property.....	7, 800
Suspension of business, including wages of employees ..	239, 000

Total.....	723, 675
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MISSISSIPPI SYSTEM—UPPER MISSISSIPPI
BASIN

WISCONSIN RIVER IN WISCONSIN

Tangible property totally or partially destroyed.....	178, 500
Prospective crops.....	600
Matured crops.....	3, 500
Livestock and other movable property.....	3, 150
Suspension of business, including wages of employees ..	7, 480

DES MOINES RIVER IN IOWA

Tangible property totally or partially destroyed.....	63, 500
Prospective crops.....	64, 300
Matured crops.....	339, 700
Livestock and other movable property.....	6, 350
Suspension of business, including wages of employees ..	8, 800

SMALL STREAMS NEAR HANNIBAL, MO.

Tangible property totally or partially destroyed.....	50, 000
Prospective crops.....	70, 000

ILLINOIS RIVER IN ILLINOIS

Tangible property totally or partially destroyed.....	28, 000
Matured crops.....	301, 000

BOURBEUSE RIVER IN MISSOURI

Prospective crops.....	10, 000
Matured crops.....	15, 000

MERAMEC RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	17, 206
Prospective crops.....	5, 000
Matured crops.....	12, 000
Livestock and other movable property.....	2, 500
Suspension of business, including wages of employees ..	2, 620

MISSISSIPPI RIVER IN MISSOURI AND ILLI-
NOIS

Tangible property totally or partially destroyed.....	42, 415
Prospective crops.....	72, 700
Matured crops.....	42, 500
Livestock and other movable property.....	75
Suspension of business, including wages of employees ..	180, 555

Total.....	1, 527, 451
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MISSISSIPPI SYSTEM—MISSOURI BASIN

SOUTH PLATTE RIVER IN COLORADO

Tangible property totally or partially destroyed.....	\$4, 310, 100
Prospective crops.....	188, 324
Matured crops.....	1, 267, 530
Livestock and other movable property.....	243, 020
Suspension of business, including wages of employees.....	31, 500

PLATTE RIVER IN NEBRASKA

Tangible property totally or partially destroyed.....	50, 000
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SOLOMON RIVER IN KANSAS

Tangible property totally or partially destroyed.....	213, 000
Prospective crops.....	7, 000
Matured crops.....	80, 000
Livestock and other movable property.....	200, 075
Suspension of business, including wages of employees.....	8, 500

SMOKY HILL RIVER IN KANSAS

Tangible property totally or partially destroyed.....	18, 000
Prospective crops.....	196, 000
Matured crops.....	443, 000
Livestock and other movable property.....	48, 000
Suspension of business, including wages of employees.....	18, 300

REPUBLICAN RIVER IN NEBRASKA

Tangible property totally or partially destroyed.....	13, 000, 000
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REPUBLICAN RIVER IN KANSAS

Tangible property totally or partially destroyed.....	993, 600
Prospective crops.....	12, 500
Matured crops.....	858, 000
Livestock and other movable property.....	455, 000
Suspension of business, including wages of employees.....	132, 500

BIG BLUE RIVER IN KANSAS

Tangible property totally or partially destroyed.....	22, 500
Prospective crops.....	5, 500
Matured crops.....	85, 600
Livestock and other movable property.....	22, 000
Suspension of business, including wages of employees.....	12, 500

KANSAS RIVER IN KANSAS

Tangible property totally or partially destroyed.....	582, 100
Prospective crops.....	105, 000
Matured crops.....	865, 500
Livestock and other movable property.....	49, 000
Suspension of business, including wages of employees.....	77, 000

GRAND RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	1, 070, 000
Prospective crops.....	2, 075, 000
Matured crops.....	1, 725, 000
Livestock and other movable property.....	100, 500
Suspension of business, including wages of employees.....	900, 000

OSAGE RIVER IN KANSAS AND MISSOURI

Tangible property totally or partially destroyed.....	167, 600
Prospective crops.....	310, 000
Matured crops.....	793, 144
Livestock and other movable property.....	11, 000
Suspension of business, including wages of employees.....	102, 000

MISSOURI RIVER IN IOWA

Tangible property totally or partially destroyed.....	500
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MISSOURI RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	1, 058, 248
Prospective crops.....	4, 790, 000
Matured crops.....	1, 212, 950
Livestock and other movable property.....	20, 000
Suspension of business, including wages of employees.....	20, 500

Total..... 38, 957, 091

MISSISSIPPI SYSTEM—OHIO BASIN

ALLEGHENY RIVER IN PENNSYLVANIA

Suspension of business, including wages of employees.....	13, 185
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MONONGAHELA RIVER IN PENNSYLVANIA

Suspension of business, including wages of employees.....	13, 950
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TUSCARAWAS RIVER IN OHIO

Tangible property totally or partially destroyed.....	\$6, 250
Prospective crops.....	7, 500
Matured crops.....	12, 000
Suspension of business, including wages of employees.....	250

MUSKINGUM RIVER IN OHIO

Tangible property totally or partially destroyed.....	3, 075, 000
Prospective crops.....	90, 000
Matured crops.....	3, 065, 000
Suspension of business, including wages of employees.....	25, 000

LITTLE KANAWHA RIVER IN WEST VIRGINIA

Tangible property totally or partially destroyed.....	1, 000
Matured crops.....	10, 000

BARREN RIVER IN KENTUCKY

Tangible property totally or partially destroyed.....	1, 200
Prospective crops.....	2, 500
Matured crops.....	10, 000
Livestock and other movable property.....	200
Suspension of business, including wages of employees.....	1, 000

GREEN RIVER IN KENTUCKY

Tangible property totally or partially destroyed.....	148, 600
Matured crops.....	536, 250
Livestock and other movable property.....	750
Suspension of business, including wages of employees.....	34, 600

WEST FORK OF WHITE RIVER IN INDIANA

Tangible property totally or partially destroyed.....	2, 700
Matured crops.....	247, 200
Suspension of business, including wages of employees.....	16, 200

WHITE RIVER IN INDIANA

Prospective crops.....	100
Matured crops.....	80, 000
Suspension of business, including wages of employees.....	2, 000

WABASH RIVER IN INDIANA

Tangible property totally or partially destroyed.....	15, 975
Prospective crops.....	4, 000
Matured crops.....	84, 400
Livestock and other movable property.....	15, 000
Suspension of business, including wages of employees.....	20, 095

CUMBERLAND RIVER IN TENNESSEE

Tangible property totally or partially destroyed.....	31, 000
Matured crops.....	14, 500
Livestock and other movable property.....	5, 000
Suspension of business, including wages of employees.....	19, 930

HOLSTON RIVER IN TENNESSEE

Tangible property totally or partially destroyed.....	6, 500
Matured crops.....	1, 200
Livestock and other movable property.....	260

FRENCH BROAD RIVER IN NORTH CAROLINA
AND TENNESSEE

Tangible property totally or partially destroyed.....	43, 200
Prospective crops.....	100
Matured crops.....	6, 200
Livestock and other movable property.....	1, 194

ELK RIVER IN TENNESSEE

Tangible property totally or partially destroyed.....	450
Prospective crops.....	75
Matured crops.....	200

DUCK RIVER IN TENNESSEE

Tangible property totally or partially destroyed.....	450
Livestock and other movable property.....	200

TENNESSEE RIVER IN ALABAMA AND
TENNESSEE

Tangible property totally or partially destroyed.....	13, 550
Prospective crops.....	10, 000
Matured crops.....	3, 200
Livestock and other movable property.....	400
Suspension of business, including wages of employees.....	9, 400

OHIO RIVER

Tangible property totally or partially destroyed.....	\$40, 100
Prospective crops.....	12, 000
Matured crops.....	726, 532
Livestock and other movable property.....	18, 780
Suspension of business, including wages of employees.....	28, 300
Total.....	<u>8, 534, 626</u>

MISSISSIPPI SYSTEM—WHITE BASIN

BLACK RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	40, 500
Matured crops.....	42, 500
Livestock and other movable property.....	10, 200
Suspension of business, including wages of employees.....	23, 500

WHITE RIVER IN ARKANSAS

Tangible property totally or partially destroyed.....	105, 150
Prospective crops.....	23, 500
Matured crops.....	388, 450
Livestock and other movable property.....	43, 950
Suspension of business, including wages of employees.....	43, 000
Total.....	<u>720, 750</u>

MISSISSIPPI SYSTEM—ARKANSAS BASIN

MONUMENT AND FOUNTAIN CREEKS IN COLORADO

Tangible property totally or partially destroyed.....	1, 882, 100
Matured crops.....	81, 000
Livestock and other movable property.....	150
Suspension of business, including wages of employees.....	10, 000

CIMARRON RIVER IN OKLAHOMA

Tangible property totally or partially destroyed.....	10, 000
Matured crops.....	3, 000

VERDIGRIS RIVER IN KANSAS

Tangible property totally or partially destroyed.....	10, 000
Prospective crops.....	60, 000
Matured crops.....	100, 000

NEOSHO RIVER IN KANSAS

Tangible property totally or partially destroyed.....	174, 700
Prospective crops.....	13, 500
Matured crops.....	820, 000
Livestock and other movable property.....	14, 250
Suspension of business, including wages of employees.....	15, 200

NORTH CANADIAN RIVER IN OKLAHOMA

Tangible property totally or partially destroyed.....	75, 000
Prospective crops.....	1, 500
Matured crops.....	28, 500
Livestock and other movable property.....	2, 000
Suspension of business, including wages of employees.....	2, 400

CANADIAN RIVER IN OKLAHOMA

Tangible property totally or partially destroyed.....	25, 500
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ARKANSAS RIVER IN COLORADO

Tangible property totally or partially destroyed.....	220, 000
Prospective crops.....	22, 000
Matured crops.....	8, 075
Livestock and other movable property.....	5, 750
Suspension of business, including wages of employees.....	500

ARKANSAS RIVER IN KANSAS

Tangible property totally or partially destroyed.....	115, 100
Matured crops.....	57, 500

ARKANSAS RIVER IN OKLAHOMA

Tangible property totally or partially destroyed.....	485, 750
Prospective crops.....	407, 000
Matured crops.....	986, 900
Livestock and other movable property.....	11, 300
Suspension of business, including wages of employees.....	67, 325

ARKANSAS RIVER IN ARKANSAS

Tangible property totally or partially destroyed.....	143, 250
Prospective crops.....	573, 400
Matured crops.....	1, 020, 200
Livestock and other movable property.....	122, 850
Suspension of business, including wages of employees.....	56, 700
Total.....	<u>7, 632, 400</u>

MISSISSIPPI SYSTEM—RED BASIN

OUACHITA RIVER IN ARKANSAS

Tangible property totally or partially destroyed.....	\$48, 875
Prospective crops.....	53, 500
Matured crops.....	120, 500
Livestock and other movable property.....	14, 750
Suspension of business, including wages of employees.....	15, 220

LITTLE RIVER IN ARKANSAS

Tangible property totally or partially destroyed.....	7, 500
Matured crops.....	61, 600
Livestock and other movable property.....	4, 100
Suspension of business, including wages of employees.....	4, 300

SULPHUR RIVER IN TEXAS

Tangible property totally or partially destroyed.....	5, 100
Prospective crops.....	5, 800
Matured crops.....	97, 500
Livestock and other movable property.....	16, 000
Suspension of business, including wages of employees.....	12, 550

CYPRESS RIVER IN TEXAS

Tangible property totally or partially destroyed.....	150
Matured crops.....	2, 400

RED RIVER

Tangible property totally or partially destroyed.....	476, 900
Prospective crops.....	203, 950
Matured crops.....	1, 285, 500
Livestock and other movable property.....	48, 025
Suspension of business, including wages of employees.....	267, 475

Total.....	<u>2, 751, 695</u>
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MISSISSIPPI SYSTEM—LOWER MISSISSIPPI BASIN

SMALL STREAMS AROUND MEMPHIS, TENN.

Tangible property totally or partially destroyed.....	200, 000
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ST. FRANCIS RIVER IN ARKANSAS

Tangible property totally or partially destroyed.....	156, 000
Prospective crops.....	77, 000
Matured crops.....	787, 600
Livestock and other movable property.....	35, 000
Suspension of business, including wages of employees.....	547, 400

TALLAHATCHIE AND YAZOO RIVERS IN MISSISSIPPI

Tangible property totally or partially destroyed.....	310, 000
Prospective crops.....	164, 000
Matured crops.....	718, 200
Livestock and other movable property.....	38, 148
Suspension of business, including wages of employees.....	1, 250, 000

MISSISSIPPI RIVER

Tangible property totally or partially destroyed.....	107, 200
Prospective crops.....	144, 000
Matured crops.....	1, 645, 000
Livestock and other movable property.....	11, 500
Suspension of business, including wages of employees.....	210, 300

Total.....	<u>6, 401, 348</u>
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MISSISSIPPI SYSTEM—ATCHAFALAYA BASIN

ATCHAFALAYA RIVER IN LOUISIANA

Tangible property totally or partially destroyed.....	4, 700
Prospective crops.....	3, 500
Matured crops.....	75, 000
Livestock and other movable property.....	2, 000
Suspension of business, including wages of employees.....	155, 000

WEST GULF OF MEXICO DRAINAGE

NECHES RIVER IN TEXAS

Tangible property totally or partially destroyed.....	5, 100
Prospective crops.....	1, 200
Matured crops.....	7, 000
Livestock and other movable property.....	1, 500
Suspension of business, including wages of employees.....	1, 500

TRINITY RIVER IN TEXAS

Tangible property totally or partially destroyed.....	\$114, 550
Prospective crops.....	8, 600
Matured crops.....	460, 200
Livestock and other movable property.....	12, 200
Suspension of business, including wages of employees..	31, 200

BRAZOS RIVER IN TEXAS

Tangible property totally or partially destroyed.....	278, 500
Prospective crops.....	97, 900
Matured crops.....	851, 825
Livestock and other movable property.....	14, 085
Suspension of business, including wages of employees..	34, 280

COLORADO RIVER IN TEXAS

Tangible property totally or partially destroyed.....	4, 814, 000
Prospective crops.....	1, 979, 750
Matured crops.....	5, 911, 000
Livestock and other movable property.....	228, 250
Suspension of business, including wages of employees..	23, 500

GUADALUPE RIVER IN TEXAS

Tangible property totally or partially destroyed.....	182, 000
Prospective crops.....	485, 000
Matured crops.....	832, 000
Livestock and other movable property.....	28, 000

NUECES RIVER IN TEXAS

Tangible property totally or partially destroyed.....	6, 200, 000
Prospective crops.....	1, 250, 000
Matured crops.....	1, 850, 000
Livestock and other movable property.....	45, 000

SMALL STREAMS AND BAYOUS IN HARRIS
COUNTY, TEXAS

Tangible property totally or partially destroyed.....	2, 500, 000
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RIO GRANDE IN NEW MEXICO

Tangible property totally or partially destroyed.....	364, 132
Prospective crops.....	26, 000
Matured crops.....	663, 000
Livestock and other movable property.....	1, 800
Suspension of business, including wages of employees..	25, 000

RIO GRANDE IN TEXAS

Tangible property totally or partially destroyed.....	112, 000
Prospective crops.....	39, 000
Matured crops.....	23, 000
Suspension of business, including wages of employees..	20, 000

Total..... 29, 762, 272

PACIFIC SLOPE DRAINAGE

SAN JOAQUIN RIVER IN CALIFORNIA

Tangible property totally or partially destroyed.....	\$25, 000
Matured crops.....	1, 000
Suspension of business, including wages of employees..	5, 000

SACRAMENTO RIVER IN CALIFORNIA

Tangible property totally or partially destroyed.....	276, 900
Prospective crops.....	137, 000
Matured crops.....	81, 250
Livestock and other movable property.....	20, 000
Suspension of business, including wages of employees..	11, 000

Total..... 557, 150

Total estimated losses for the United States.. 127, 144, 841

Estimated value of property saved by warnings

ATLANTIC SLOPE DRAINAGE

Connecticut River in New England.....	65, 000
Chenango River in New York.....	44, 300
Susquehanna River in New York and Pennsylvania..	135, 550
James River in Virginia.....	605, 000
Roanoke River in Virginia and North Carolina.....	68, 100
Tar River in North Carolina.....	3, 000
Neuse River in North Carolina.....	2, 000
Cape Fear River in North Carolina.....	7, 000
Peedee River in South Carolina.....	5, 000
Savannah River in Georgia and South Carolina.....	64, 500

EAST GULF OF MEXICO DRAINAGE

Tallapoosa River in Alabama.....	\$4, 000
Alabama River in Alabama.....	2, 000
Tombigbee River in Alabama.....	71, 350
Pascagoula River in Mississippi.....	50, 500
Pearl River in Mississippi.....	144, 700

MISSISSIPPI SYSTEM—UPPER MISSISSIPPI BASIN

Wisconsin River in Wisconsin.....	250, 000
Des Moines River in Iowa.....	27, 000
Meramec River in Missouri.....	4, 500
Mississippi River in Wisconsin, Missouri, and Illinois..	16, 100

MISSISSIPPI SYSTEM—MISSOURI BASIN

Solomon River in Kansas.....	55, 000
Smoky Hill River in Kansas.....	80, 500
Republican River in Kansas.....	987, 000
Big Blue River in Kansas.....	16, 000
Kansas River in Kansas.....	1, 335, 000
Grand River in Missouri.....	2, 100, 000
Osage River in Kansas and Missouri.....	225, 000
Missouri River in Iowa and Missouri.....	679, 000

MISSISSIPPI SYSTEM—OHIO BASIN

Allegheny River in Pennsylvania.....	11, 500
Monongahela River in Pennsylvania.....	25, 000
Muskingum River in Ohio.....	100, 000
Barren River in Kentucky.....	10, 000
Green River in Kentucky.....	555, 900
West Fork of White River in Indiana.....	2, 800
White River in Indiana.....	7, 500
Wabash River in Indiana.....	35, 750
Cumberland River in Tennessee.....	105, 500
Holston River in Tennessee.....	50
Elk River in Tennessee.....	800
Duck River in Tennessee.....	5, 000
Tennessee River in Alabama and Tennessee.....	19, 000
Ohio River.....	130, 053

MISSISSIPPI SYSTEM—WHITE BASIN

Black River in Missouri.....	6, 000
White River in Arkansas.....	333, 500

MISSISSIPPI SYSTEM—ARKANSAS BASIN

Cimarron River in Oklahoma.....	4, 500
Neosho River in Kansas.....	78, 000
North Canadian River in Oklahoma.....	5, 600
Petit Jean River in Arkansas.....	500
Arkansas River.....	3, 703, 100

MISSISSIPPI SYSTEM—RED BASIN

Ouachita River in Arkansas.....	195, 300
Little River in Arkansas.....	82, 000
Sulphur River in Texas.....	171, 000
Cypress River in Texas.....	6, 000
Red River.....	1, 202, 500

MISSISSIPPI SYSTEM—LOWER MISSISSIPPI BASIN

St. Francis River in Arkansas.....	310, 000
Tallahatchie and Yazoo Rivers in Mississippi.....	145, 000
Mississippi River below Cairo, Ill.....	338, 500

WEST GULF OF MEXICO DRAINAGE

Neches River in Texas.....	500
Trinity River in Texas.....	215, 400
Brazos River in Texas.....	379, 000
Colorado River in Texas.....	1, 491, 500
Guadalupe River in Texas.....	414, 000
Nueces River in Texas.....	554, 500
Rio Grande in Texas.....	110, 000

PACIFIC SLOPE DRAINAGE

Sacramento River in California.....	318, 000
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Total estimated savings for the United States.. 18, 120, 353